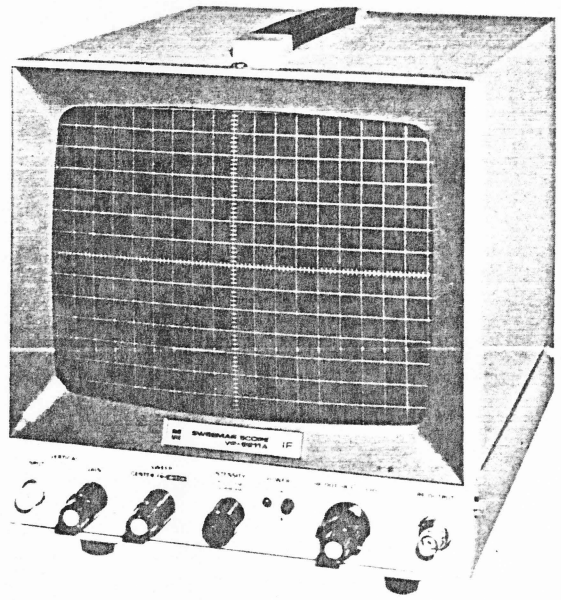
Instruction Manual

SWEEMAR SCOPE

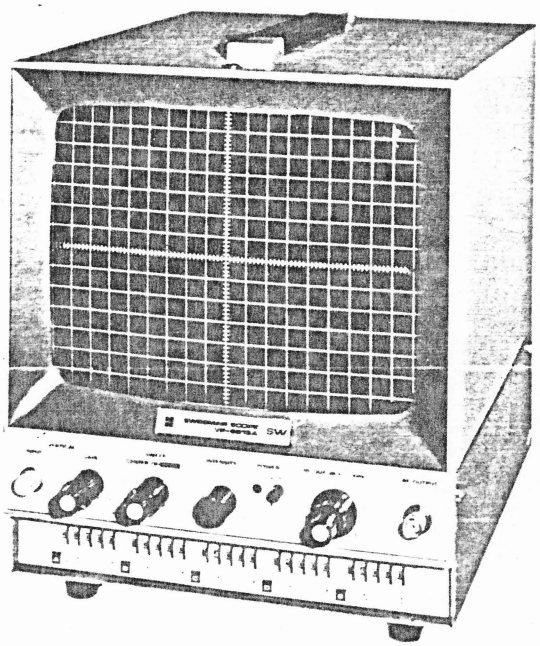
VP-8911A VP-8912A
VP-8913A VP-8914A

National

National National



VP-8911A IF Band



VP-8912A LW-MW Band

VP-8913A SW Band

VP-8914A FM Band

CONTENTS

Section 1. CHECKING FOR PROPER LINE VOLTAGE AND PROTECTING ATTENUATOR

AC power supply

The Sweemar Scope in this series is designed to operate on a 100 V, 115 V, 215 V, or a 230 V AC power supply depending on position of line voltage selector. The unit is normally shipped from the factory set to operate on a line voltage of 100 V.

When a modification is made to permit the unit to be operated at a voltage other than 100 V, a tag indicating the prescribed voltage is attached to the end of the power cord.

The voltage range indicated by the arrow of the line voltage selector plug located on the rear panel of this unit is the operating voltage. Prior to use, make certain this indication matches the line voltage.

Protecting attenuator

The attenuator circuit used in the units of this series is electronic, and compared to the older units, is much easier to handle, however, an external voltage applied to the output cable terminal may destroy the attenuator circuit. Be particularly careful not to let any voltage potential contact with this terminal.

Section 2. GENERAL

2.1 General description and features

The Sweemar Scope VP-8910A series has combined the sweep signal generator, monitor scope, and the variable marker circuit into one cabinet, and as a sweep signal generator, possesses a number of new functions.

One of the shortcomings found in the previous sweep signal generators has been the difficulty in changing the marker frequency. This has been solved by use of the digital - type variable marker circuit. The digital switch located under the front panel may be changed in steps of 1 kHz in the LW-MW and the SW band, and in 10 kHz steps in the FM band. This allows the user to freely make the desired marker frequency settings and readings, while the accuracy and stability of the crystal resonator type marker is maintained. Consequently, maintenance for marker frequency change is not necessary, effectively increasing the in-use time of the equipment.

Also, the 9-inch, large screen monitor included in one cabinet has made a smaller and more lightly constructed unit available than conventional "genescopes". The cables required to this Sweemar Scope are only two, one from sweep signal output and the other for detected signal from the device being measured, making the reshuffle of the equipment due to changes in the production line more simple. The units may also be used effectively on the workbench.

Other features include a sweep signal output (RF signal) of 100 mVrms, built-in 80 dB electronic attenuator which may also be remotely controlled, and the accuracy of the tracking adjustment has been increased by slowing down the sweep rate only in the areas close to the marker frequencies.

Such new functions make this sweep signal generator with monitor valuable for assembly of radios, filters, and other components.

Features:

[1] Built-in digital-type variable marker generator circuit.

[2] High-precision, highly stable marker.

[3] Marker circuit covering a wide range of frequency.

[4] High-precision tracking measurement.

[5] Built-in electronic-type attenuator which may be controlled remotely.

[6] Combined monitorscope.

[7] A series covering all radio frequency bands.

2.2 Specifications

	VP-8911A		AP-8912A	VP-8913A	VP-8914A
Sweep frequency					
Frequency range	415~ 485kHz	10.25~ 11.15MHz	130~ 1,800kHz	1.5~ 29.9MHz	75~ 110MHz
Center frequency range	445~ 465kHz	10.55~ 10.85MHz	180~ 1,700kHz	2.5~ 29MHz	76.5~ 108.5MHz
Sweep width	25~60kHz	0.4~ 0.9MHz	0.3~ 1.5MHz	2~15MHz	3~35MHz
Band selector	NORM-AM	PULL-FM			
Sweep output					
Output voltage	100dB (0.1Vrms) into 50Ω band				
Output impedance	50Ω				
Attenuator	10 dB steps, 7 ranges 0 to 10dB continuously variable				
Marker section					
Frequency	455kHz ±5kHz, ±10kHz	10.7MHz ±75kHz, ±150kHz	Any frequency within the sweep range		
Setting	Fixed	Fixed	4-digit digital switch	5-digit digital switch	
Minimum interval			1kHz		10kHz
Frequency accuracy	±0.01%		±0.05%		
Number of markers	5 points simultaneous				
Marker type	Intensity modulation				
Monitor section					
Sweep repetition rate	25Hz/30Hz				
Sweep waveform	Sawtooth wave				
Duty cycle	Approx. 1 : 19				
Vertical axis sensitivity	10 mV/DIV. variable				
Vertical axis frequency range	DC ~ 5 kHz (5 DIV.)				
Vertical axis input impedance	Approx. 500 kΩ				
Horizontal axis amplitude	Over 17 DIV. (Fixed)				
CRT	9-inch, 90° electro-magnetic deflection cathode-ray tube				
Power supply					
Voltage	100V, 115V, 215V, 230V each ±10%				
Frequency	50Hz/60Hz				
Power consumption	less than 45 VA				

	VP-8911A	VP-8912A	VP-8913A	VP-8914A
Dimensions/Weights				
Height	230mm	260mm		
Width	225mm			
Depth	310mm			
Weight	Less than 8 kg			
Accessories	Hood 1			
	Fuse 1			
	Instruction manual 1			
	AF cable (red) 1			
	RF cable (black) 1			

Section 3. OPERATING INSTRUCTIONS

3.1 Installation

Prior to permanently installing the Sweemar Scope on the workbench, the following items should be noted.

A location should be selected where reflections from the lighting in the area will not make the CRT display hard to watch. The accessory hood may be used to eliminate most reflections. (Refer to Section 3., Item 3.5). The stand attached to the bottom plate may also be used to make the CRT easier to see.

3.2 Checking the power supply

Prior to performing the operational check, make certain the AC power supply voltage to the workbench is matched with the main power supply setting of the unit and that the rating of the fuse is correct.

3.2.1 Setting main power supply voltage

The Sweemar Scope series is designed to be operated with power supply voltages of 100 V, 115 V, 215 V, or 230 V by changing the connection of line voltage selector located on the rear panel. The voltage the unit has been set at is indicated by the arrow located in the LINE VOLTAGE indicator plate on the rear panel. If it does not agree with the line voltage to be used, it should be set using the following procedures.

1. Remove the LINE VOLTAGE indicator plate from the rear panel of the unit.
2. Pull out the plug with the arrow on it, turn it to the correct voltage indication and re-insert it.

3. Make certain the LINE VOLTAGE plate is tightened down before using the unit.

3.2.2 Main power supply fuse rating

A fuse is built into the fuse holder fixed to the rear panel, to which the main power supply cord is connected.

When changing the voltage of the main power supply, or using the equipment for the first time, always make certain the power supply voltage and the fuse rating is correct.

Main power supply voltage	Fuse rating	Fuse designation
100 - 115V	1 ampere	125V, 1A
215 - 230V	0.5 ampere	250V, 0.5A

3.3 Controls and Connectors

A front and rear panel diagram is included in the folding pages located at the back of this manual. The numbers used in the explanation that follows correspond to the numbers of the controls and connectors in the diagram and should be referred to while the nomenclature and operating procedure is explained in this section.

Front panel

① RF OUTPUT ..... Sweep signal output terminal. An output voltage of 100 mVrms (50Ω load termination) may be obtained with all models of the series.

② ATT dB ..... 10 dB step attenuator. Turning this control counterclockwise provides 70 dB of attenuation. Since it is an electronic type attenuator, remote control of

attenuation is possible by removing the switch and level controller from front panel and using an extension cord.

③ LEVEL ..... Dual shaft consisting of the 10 dB continuously variable attenuator and the step attenuator. The inner shaft is the 10 dB continuously variable attenuator, and the outer shaft is the step attenuator. Turning the control clockwise reduces the attenuation and increases the level.

④ SWEEP —CENTER ..... This control adjusts the center frequency of the sweep signal oscillation. Turning the control clockwise increases the frequency.

⑤ SWEEP —WIDTH ..... This control is used to adjust the sweep frequency range of the sweep signal oscillation. Turning the control clockwise makes the sweep width wider and the space between the markers more narrow.

⑥ INTENSITY ..... This control adjusts the intensity of the brightness on the monitor. Turning the control clockwise increases the intensity.

⑦ PULL-FM NORM-AM ..... This function is only available on the VP-8911A IF Sweemar Scope. In the pushed-in position, AM-IF is obtained from the RF output terminal, and in the pulled-out position, FM-IF is obtained. This switch also serves as the INTENSITY control, with the intensity being adjustable while the switch is in either position.

⑧ (Power pilot) ..... This lamp lights when the power is ON.

⑨ POWER ON/OFF ..... When the power switch is in the ▬ position, the power is ON, in the ▮ position, the power is OFF. The power is OFF when the shaft is popped out.

⑩ GAIN ..... This is the gain control for the vertical axis. Turning the control all the way to clockwise brings it to a calibrated sensitivity of 10 mV/DIV. Counter-clockwise (CCW) rotation lessens the sensitivity, and if turned completely CCW, over 40 dB of attenuation is obtained.

⑪ ↕ ..... This is the vertical position control for the monitor. Turning the control clock-wise moves the trace toward the top of the screen.

⑫ V. INPUT ..... This is the input terminal to the vertical axis of the monitor. Because of its high input impedance, approximately 500 kΩ, it affects the device being measured very little.

⑬ (Digital switch) .... This switch is used for setting the marker frequency in the variable type marker circuit. Provided on all units except the VP-8911A IF Sweemarscope, the details and operating procedure may be described in Item 3.4 of this manual.

Rear panel

⑭ (Power cord) ..... This is the main power cord and is fitted with a 3-prong grounded plug.

⑮ FUSE ..... This is the primary-side fuse. The rating of the fuse used should be in accordance with the main power voltage.

⑯ (Ground terminal) .. The ground terminal provided on the cabinet should always be connected to ground for safety.

⑰ LINE VOLTAGE selector ..... This plug and socket type device is used to convert the voltage of power transformer primary winding of the unit to make it operate from a deferent voltage. The plate is fixed on by two screws, and the voltage indicated by the arrow is the voltage the unit is presently set to operate at.

3.4 Operating procedure

3.4.1 General operations

(1) Prior to turning on the power switch, set all the controls to the positions indicated below.

Front panel	Controls	Position
	ATT dB	100 dB
	LEVEL	CAL
	SWEEP CENTER	Center
	SWEEP WIDTH	Fully clockwise (CW)
	INTENSITY	Fully counterclockwise (CCW)
	GAIN	Anywhere
	↕	Center
Rear panel	LINE VOLTAGE	Set to line voltage

(2) Press the POWER ON.OFF switch.

(3) Watching the CRT screen, adjust the INTENSITY to a level easy to see. Since the horizontal axis is connected internally in the unit, no horizontal position or horizontal gain adjustments will be necessary. The vertical position is adjusted by turning the control with a ↕ mark on it. Set it to the proper position.

3.4.2 Setting marker frequency

(1) The marker frequency is pre-set internally in model VP-8911A IF Sweemar Scope and needs no further attention. Whereas on the other models, the setting is made using the digital switches located under the front panel.

(2) The digital switches are divided into five divisions by every 4 or 5 digits with each division being indicated with the letters A, B, C, D, and E from the left respectively, and the frequency units are noted with the marks MHz or kHz.

(3) When setting the marker frequency, always start with the lowest value in the A division, assigning the lowest marker frequency in this division. Then working toward the right, gradually set the frequency to a higher setting.

(4) Since the digital switch has no locking mechanism, it may be set on any value from 0 to 9, however, it should be set within the sweep frequency range for each of the A, B, C, D, or E divisions. When set outside this range, the marker will fail to appear or it could result in an error in the operations. When this happens, returning the digital switch back to a value within the sweep frequency range will restore normal operations.

(5) Some of the errors that may occur due to a faulty frequency setting are;

(a) The digital switch being set to a value lower than the sweep frequency range will result in the marker being at the left edge of the trace. A correct value will not be indicated in this case.

(b) The digital switch being set to a value higher than the sweep frequency range will result in the marker disappearing off the right hand side of the screen.

(c) If the digital switches in both A and B divisions are set to the same value, the two markers will not overlap, but appear apart with a fixed space between them. When the A division digital switch is gradually set higher, the B marker will move to the right as if it were being pushed. Naturally this will result in an error.

(6) When the markers have a fixed space between them, the digital switch of the lowest frequency marker must be set to the far left position and digital switches of higher frequencies must be set toward the right as noted in(3) above in order to restore normal operations.

(7) The marker to marker space cannot be set smaller than a certain value due to circuit design. This smallest marker to marker space is also relative to the sweep frequency range, and is obtained as a value of (sweep signal frequency range)/40.

(8) If sweep width of RF signal is more than five times the lowest set marker frequency, markers may flicker. In this case operation can be restored to normal by making the sweep width narrower with the SWEEP WIDTH control.

3.4.3 Setting sweep signal frequency range

(1) Starting from the left side A of the digital switch and working toward the right, increase the setting values in order of A, B, C, D, and E.

(2) When these 5 point markers are all set and displayed on the screen, adjust the SWEEP CENTER and the WIDTH controls located on the front panel.

(3) This completes the setting of the sweep signal frequency.

3.4.4 Measurement procedure

(1) The output voltage should be taken from the RF OUTPUT connector through either a loop antenna or RF cable attached as accessory, and then applied to the device to be measured. The output voltage of the units in this series is 100 mVrms when terminated by 50Ω load.

(2) The signal from the device being measured is passed through a detector, then applied to the V INPUT connector of Sweemar Scope.

(3) The attenuator value should be adjusted appropriately so that the device being measured does not receive excessive input. Also V. GAIN and the vertical positioning control of the monitor section should be set for the trace on the screen to be watched easily.

(4) Tracking adjustments may be made by changing the tuned frequency of the device being measured.

3.4.5 Notes on measuring

General

When using a sweep signal generator to make tracking adjustments, the amplitude of the characteristic curve on the screen will appear lower than it actually is. This amplitude drop would be compared with the measurement value obtained by using a standard signal generator by using the equation below.

$$a = \left[1 + 0.195 \left(\frac{F}{TB^2} \right)^2 \right]^{-\frac{1}{4}}$$

a : level drop ratio

F : Sweep frequency width (Hz)

T : Sweep rate (sec)

B : 3 dB bandwidth (Hz) of the device being measured.

The apparent bandwidth is calculated by the following equation.

$$= \frac{B}{a^2}$$

a : The level drop ratio obtained from the above equation.

B : 3 dB bandwidth (Hz) of the device being measured.

To make accurate measurements, it would be better to have slower sweep speed and narrower sweep width. However, in an actual measurement,there is a limit due to flicker of the trace and increase in measurement time.

For the ideal tracking adjustment in a radio receiver;

(1) Rotate dial of the radio receiver under test to tune it to a desired frequency.

(2) With the radio receiver left in the same state, apply the RF OUTPUT signal and observe the characteristic curve. Position the characteristic curve in the center of the screen by making sweep width narrow.

(3) The characteristic curve should appear on the screen as shown in the Fig. 3-4-1 below. Now changing the setting value of the digital marker switch, bring the marker to the highest point of the characteristic curve.

(4) Then restore the sweep width to normal by adjusting SWEEP WIDTH control.

(5) Sometimes marker may be seen shifted from top of the characteristic curve as shown in Fig. 3-4-2.

(6) In this case, move the marker to the top by resetting the digital marker switch as shown Fig. 3-4-3.

(7) This state faithfully represents the tracking marker, by this sweep generator, taking every factor like sweep time, bandwidth, delay etc. into consideration.

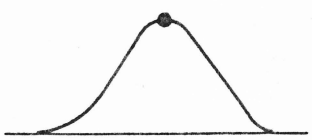


Fig. 3-4-1

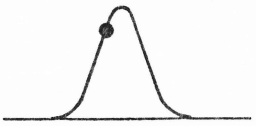


Fig. 3-4-2

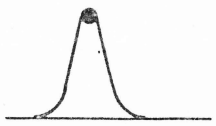


Fig. 3-4-3

The units in this series are swept by a sawtooth wave of 1/2 the line frequency (duty cycle 19:1), and have brought the sweep rate down to near the limit of flicker.

At marker points, sweep speed of horizontal sweep signal and sweep oscillation drive signal are slowed down for period of 1 msec, resulting in magnified amplitude of characteristic curve at marker points and more accurate marker frequencies.

3.5 Attaching light shield hood

The light shield hood is included as an accessory, and should be mounted on the unit to block unwanted light and make the screen easier to see. It is attached by the procedures listed below.

(1) Loosen 3 of the outer cabinet fastening screws from around the front panel. (1 on the top, and 1 on each side.)

(2) Match the hood to the 3 screws and push it back as far as it will go. Tighten the screws.

Section 4. MAINTENANCE

4.1 Adjusting inclination of trace

The horizontal trace may appear inclined on the screen due to the effects of earth magnetism etc. This will vary depending on the particular location the unit is used, However, when the horizontal trace is not parallel to the horizontal graticule, it must be adjusted using the following procedure.

(1) Remove the two screws from the top of the cabinet.

> NOTE DANGER
>
> The high-voltage CRT accelerator circuit is located inside this portion of the cabinet. Be particularly careful not to make contact with it.

(2) Loosen the hook-screw holding the deflection-yoke on the neck of the CRT. While observing the screen, bring the horizontal trace parallel to the horizontal graticule by rotating the deflection yoke in extremely small increments.

(3) When it is accurately matched, tighten up the hook-screw holding the deflection yoke. When doing this, tighten up the hook-screw while pushing the yoke gently toward the screen side to prevent it from slipping off onto the socket of the tube.

4.2 Cleaning graticule plate

When the graticule plate becomes dirty, brightness of the tube is sharply reduced and the display becomes hard to see. It should be cleaned periodically.

(1) Removal

The graticule plate is held in at the four points indicated by

the arrows in Fig. 4.2.1. The plate is removed by pressing in and rotating it either right or left.

(2) Cleaning

The front and rear of the graticule plate, and the screen of the CRT should be cleaned using a clean, dry cloth. Do not use alcohol, tetrachlorides, acetone, or other organic solvents.

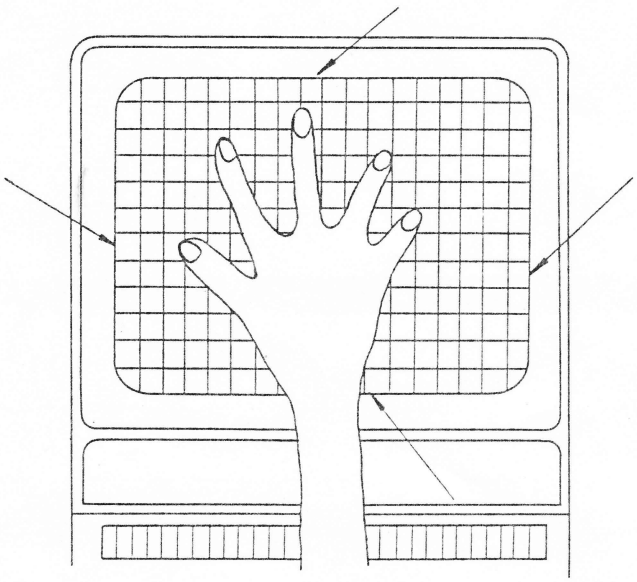


Fig. 4.2.1

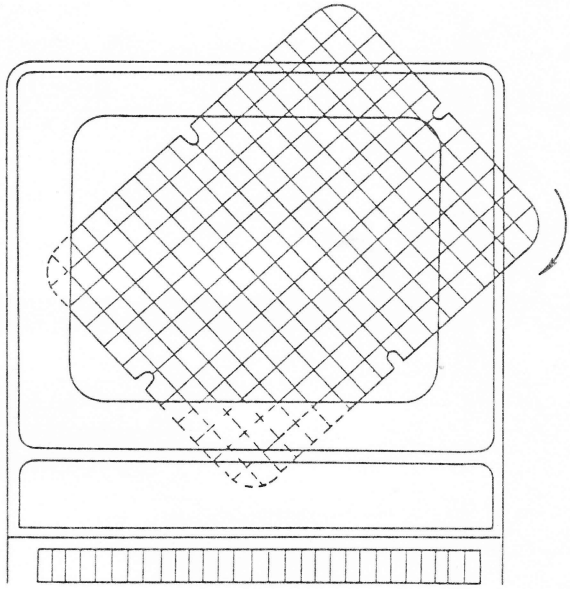


Fig. 4.2.2

(3) Installation

The corners of the plate should be slipped between the frame and the screen as shown in Fig. 4.2.2, and then rotated slowly in the direction of the arrow. The indentations cut into each edge of the plate will fit into projections behind the panel. When the plate is correctly installed, there should be very little movement in the plate. Check and make sure that the graticule plate fits in the frame.

4.3 Maintenance precautions

This section covers the procurement of parts, special precautions in replacing parts, and service.

4.3.1 Procurement of spare parts

The electrical components and the mechanical parts for the units of this series may be obtained from the dealer from whom this instrument is obtained.

4.3.2 Special precautions in replacing parts

As a rule, the manufacturer recommends that the unit be shipped to one of its service centers qualified to make repairs on the unit when it is in need of service. The owner choosing to replace parts himself should note the following items.

(1) The h_{fe} designation rank of the transistors.

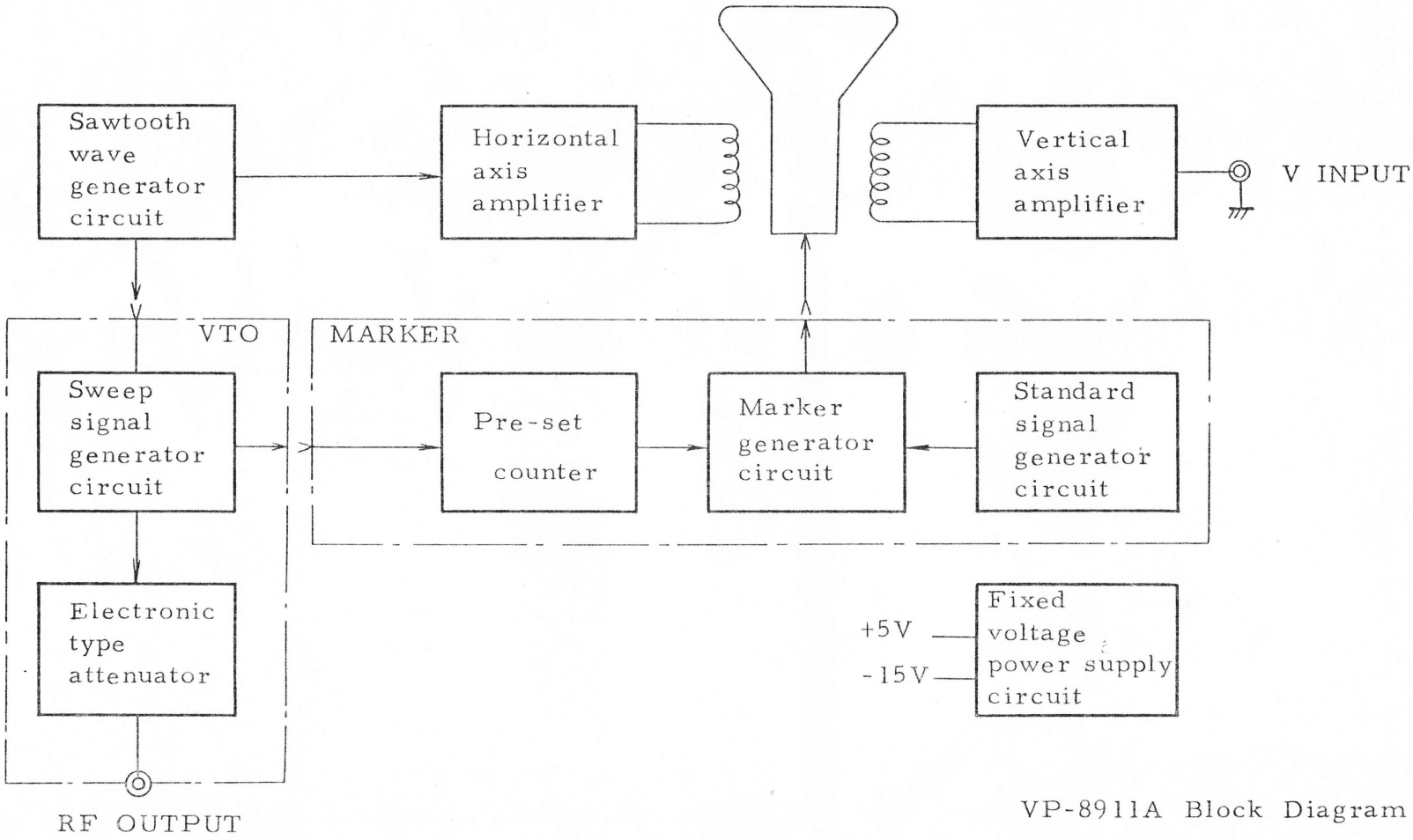
(2) The working voltage of the electrolytic capacitors.

(3) The wattage rating of the fixed resistors.

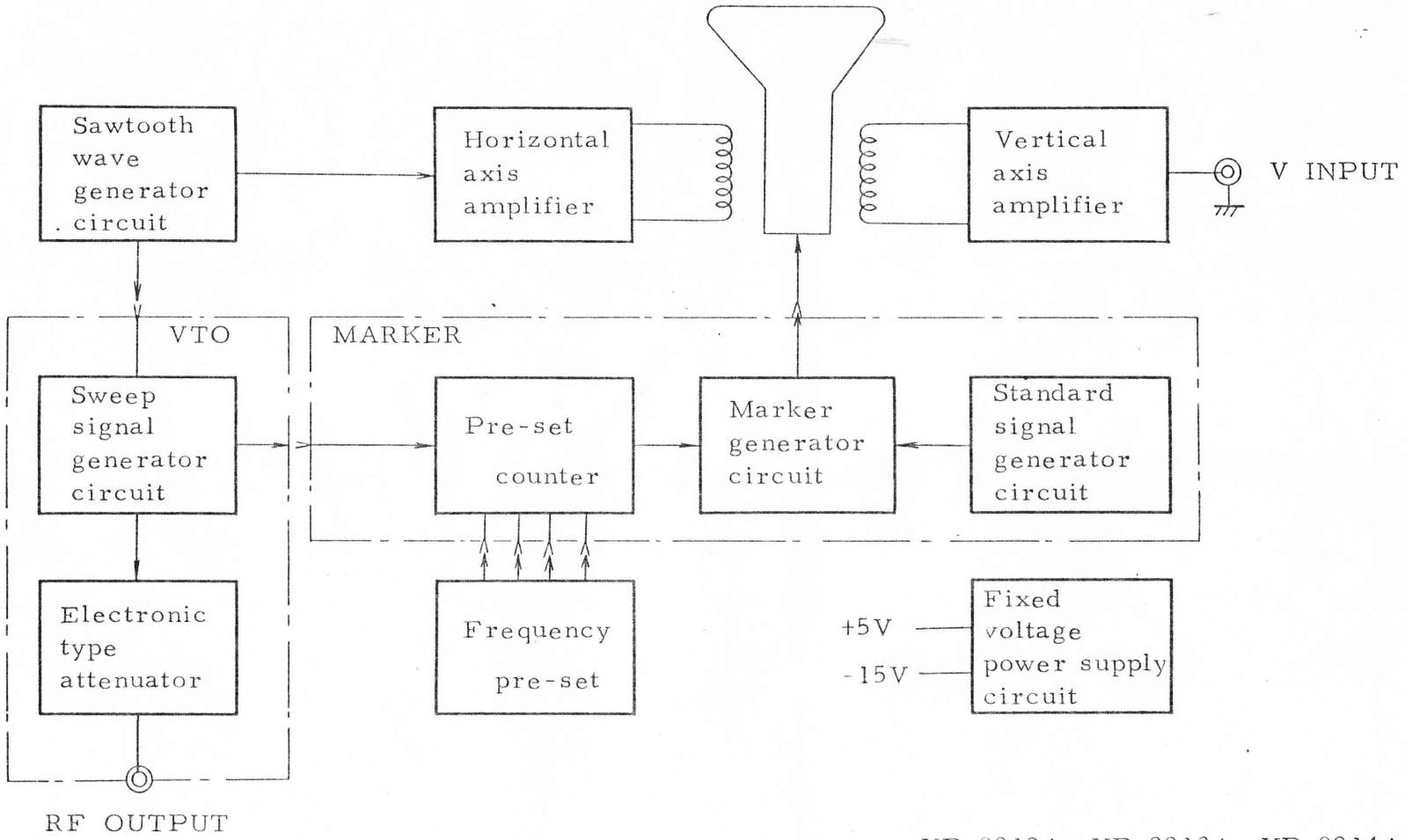
4.3.3 Communications with service center

When it becomes necessary to write to or otherwise contact one of the service centers concerning your unit, the following data should be included.

- Model (VP-8911A etc.)
- Serial number of the set (Label on rear panel)
- Symptoms

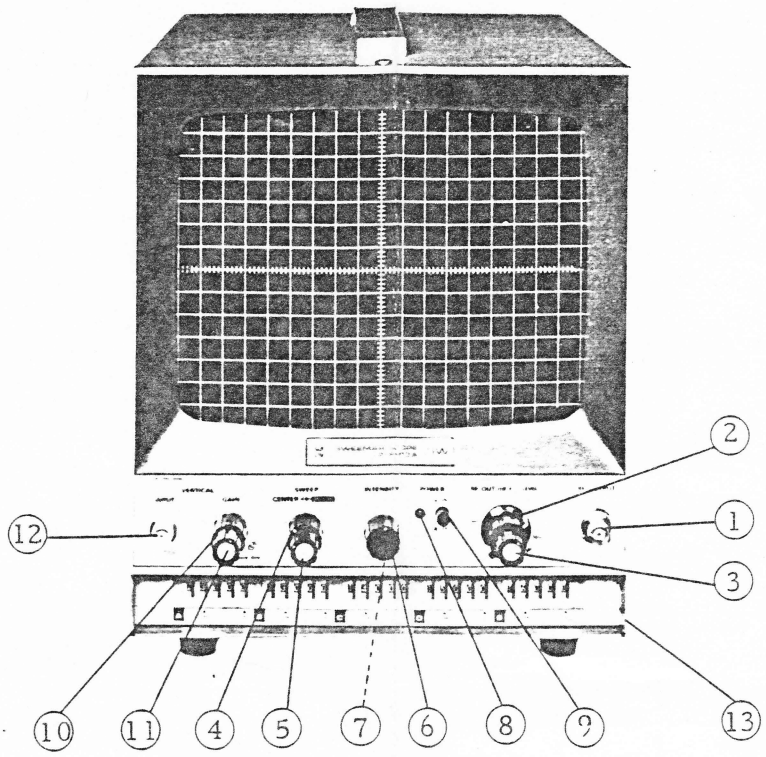


VP-8911A Block Diagram



VP-8912A, VP 8913A, VP-8914A

Block Diagram



VP-8911A
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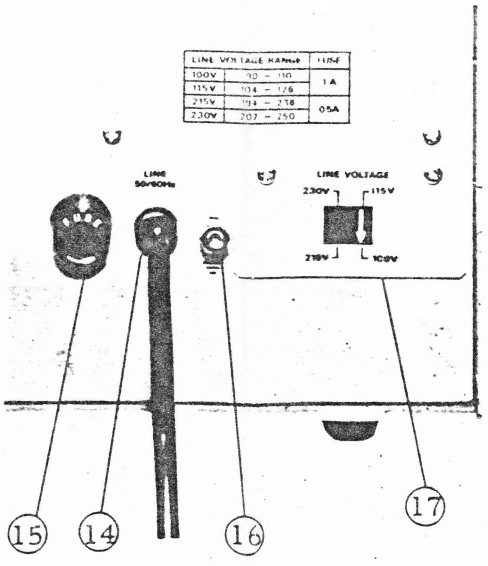
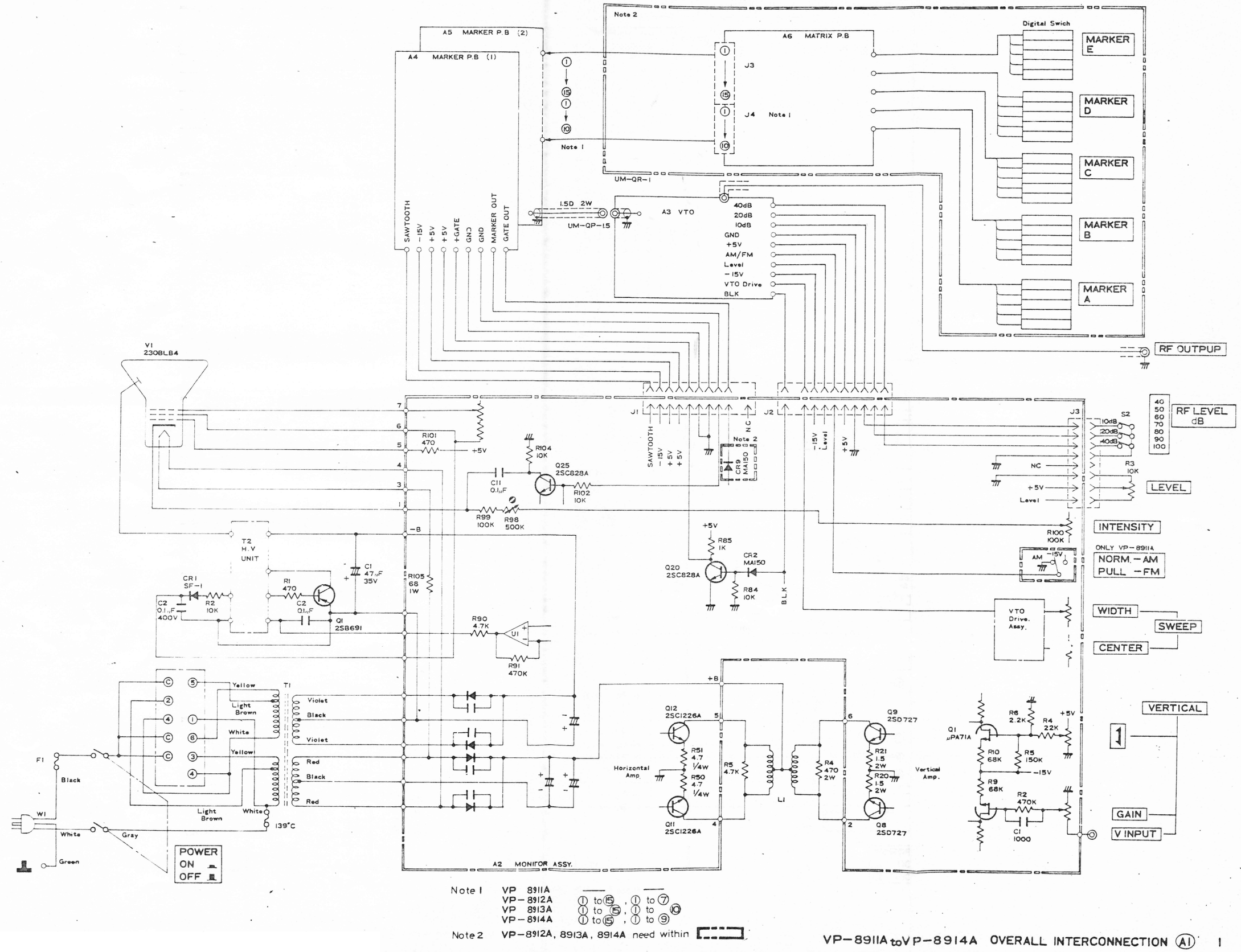
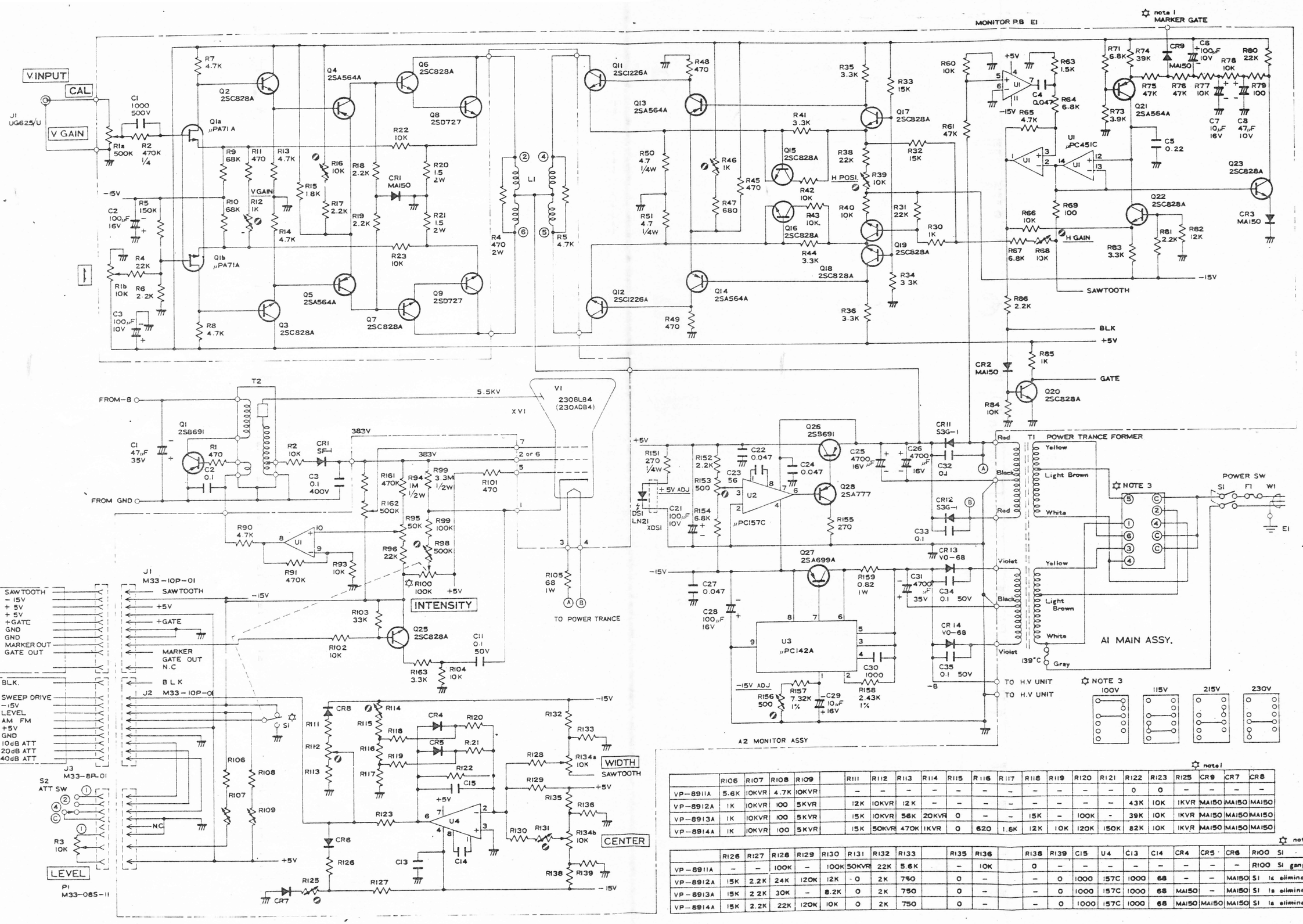




Note 1 VP 8911A —— ① to ⑮ , ① to ⑦
VP-8912A ① to ⑮ , ① to ⑩
VP 8913A ① to ⑤ , ① to ⑦
VP-8914A ① to ⑮ , ① to ⑨

Note 2 VP-8912A, 8913A, 8914A need within ▭

VP-8911A to VP-8914A OVERALL INTERCONNECTION (A1) 1

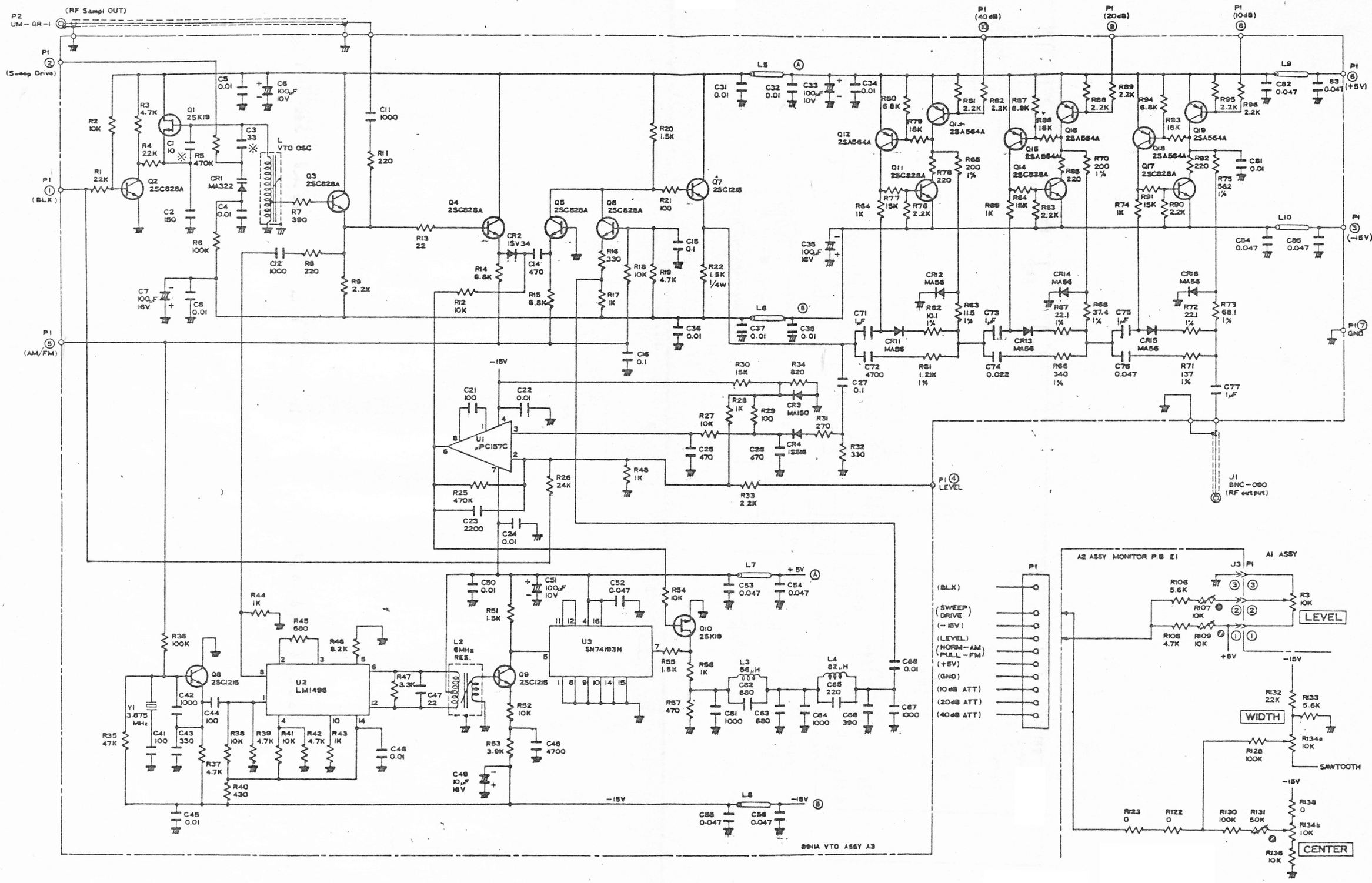


note 1

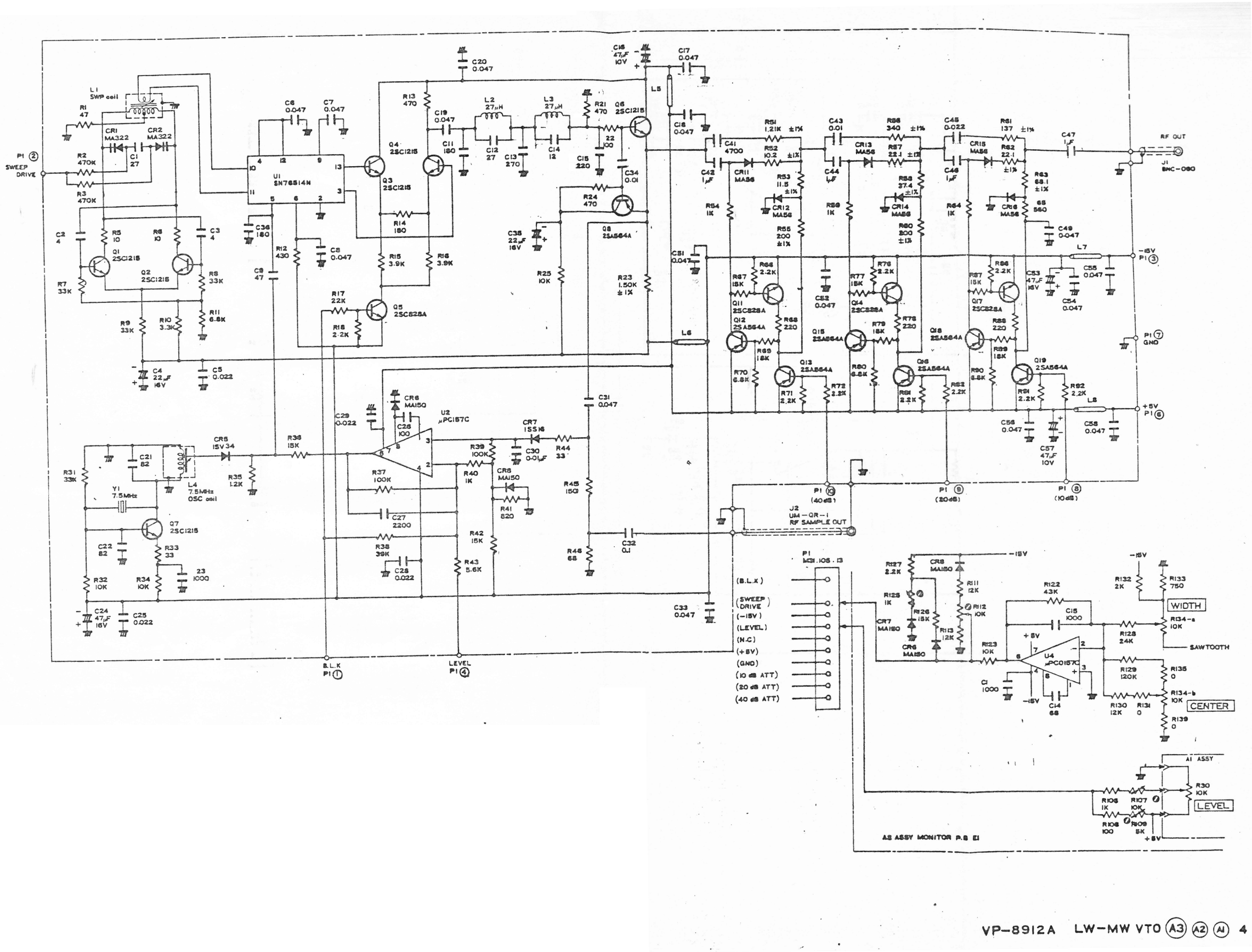
	R106	R107	R108	R109		R111	R112	R113	R114	R115	R116	R117	R118	R119	R120	R121	R122	R123	R125	CR9	CR7	CR8
VP-8911A	5.6K	10KVR	4.7K	10KVR		–	–	–	–	–	–	–	–	–	–	–	0	0	–	–	–	–
VP-8912A	1K	10KVR	100	5KVR		12K	10KVR	12K	–	–	–	–	–	–	–	–	43K	10K	1KVR	MA150	MA150	MA150
VP-8913A	1K	10KVR	100	5KVR		15K	10KVR	56K	20KVR	0	–	–	15K	–	100K	-	39K	10K	1KVR	MA150	MA150	MA150
VP-8914A	1K	10KVR	100	5KVR		15K	50KVR	470K	1KVR	0	620	1.8K	12K	10K	120K	150K	82K	10K	1KVR	MA150	MA150	MA150

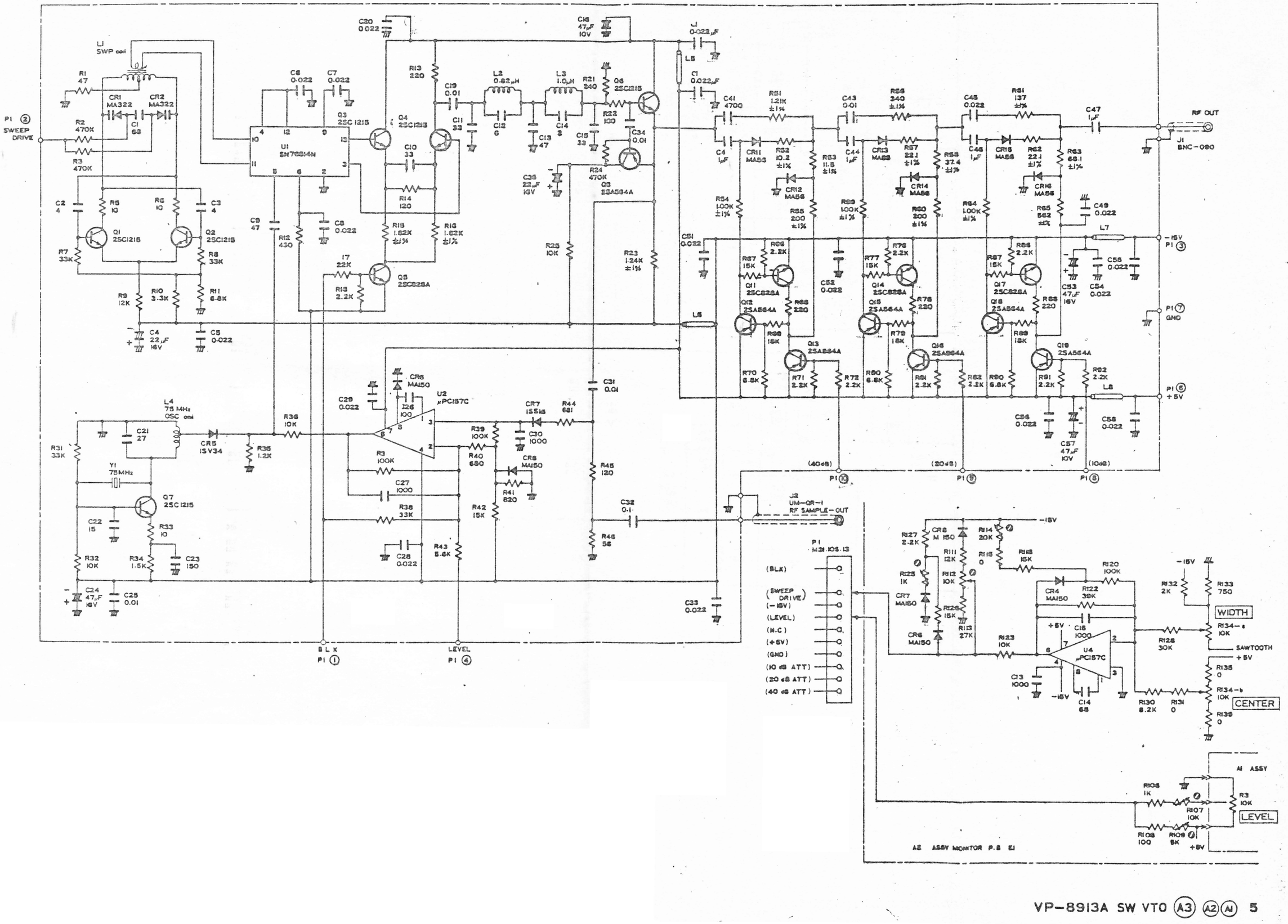
note 2

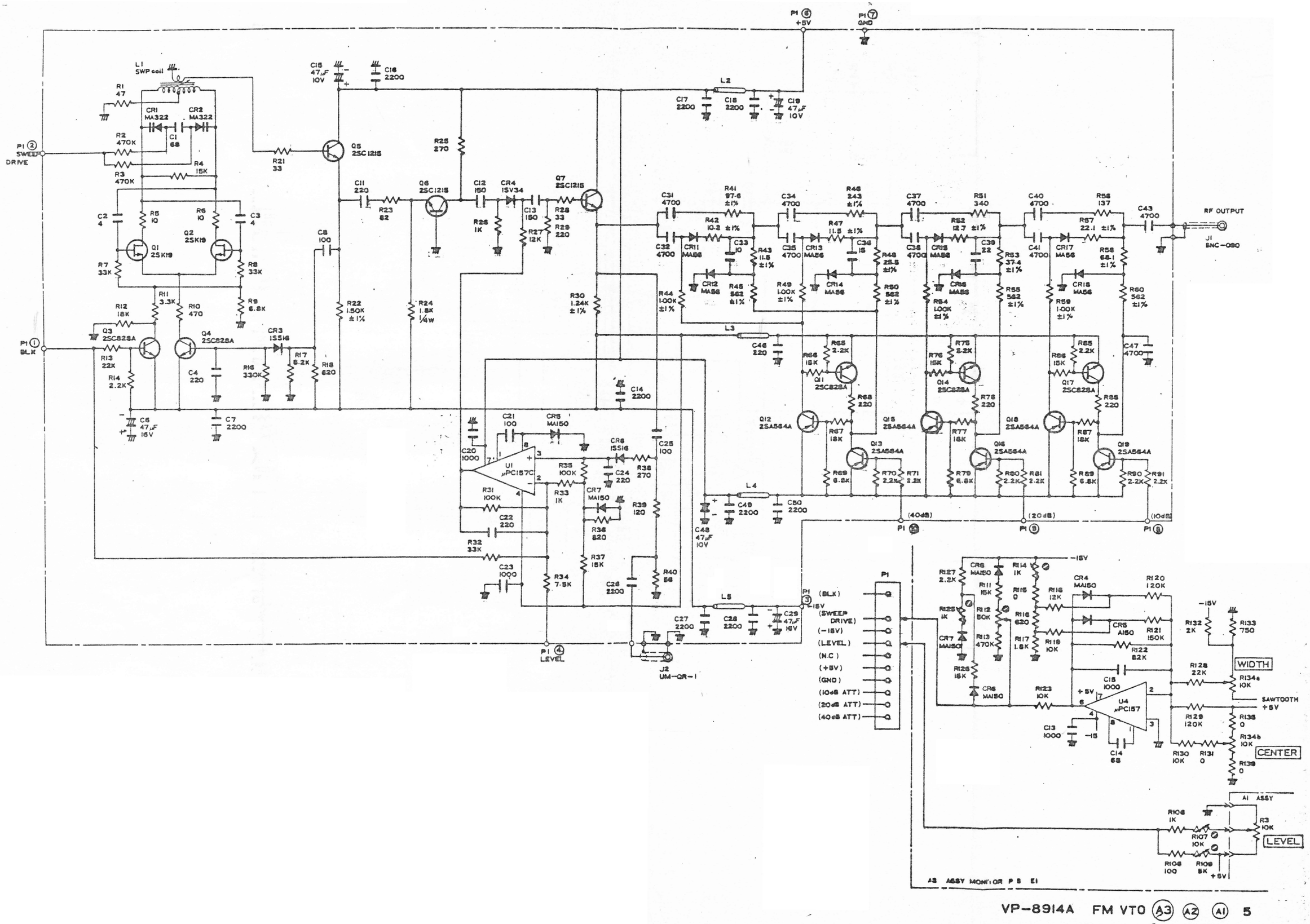
	R126	R127	R128	R129	R130	R131	R132	R133		R135	R136		R138	R139	C15	U4	C13	C14	CR4	CR5	CR6	R100 SI
VP-8911A	–	–	100K	–	100K	50KVR	22K	5.6K		–	10K		0	–	–	–	–	–	–	–	–	R100 SI ganged
VP-8912A	15K	2.2K	24K	120K	12K	0	2K	750		0	–		–	0	1000	157C	1000	68	–	–	MA150	SI is eliminated
VP-8913A	15K	2.2K	30K	–	8.2K	0	2K	750		0	–		–	0	1000	157C	1000	68	MA150	–	MA150	SI is eliminated
VP-8914A	15K	2.2K	22K	120K	10K	0	2K	750		0	–		–	0	1000	157C	1000	68	MA150	MA150	MA150	SI is eliminated



VP-8911A IF VTO (A3) (A2) (A1) 3


P1 ② SWEEP DRIVE
L1 SWP coil
R1 47
CR1 MA322
CR2 MA322
C1 27
R2 470K
R3 470K
U1 SN76514N
C6 0.047
C7 0.047
C8 0.047
C9 47
C36 180
R12 430
Q1 2SC1215
Q2 2SC1215
R5 10
R6 10
C2 4
C3 4
R7 33K
R8 33K
R9 33K
R10 3.3K
R11 6.8K
C4 22μF 16V
C5 0.022
Q3 2SC1215
Q4 2SC1215
R13 470
R14 180
R15 3.9K
R16 3.9K
R17 22K
R18 2.2K
Q5 2SC828A
C20 0.047
C19 0.047
C11 180
L2 27μH
L3 27μH
C12 27
C13 270
C14 12
R21 470
Q6 2SC1215
C15 220
22 100
C34 0.01
R24 470
C35 22μF 16V
Q8 2SA564A
R25 10K
R23 1.50K ±1%
C16 47μF 10V
C17 0.047
C18 0.047
L5
L6
C51 0.047
C52 0.047
R41 1.21K ±1%
R52 10.2 ±1%
R53 11.5 ±1%
CR11 MA56
CR12 MA56
R54 1K
C41 4700
C42 1μF
C43 0.01
C44 1μF
R56 340 ±1%
R57 22.1 ±1%
R58 37.4 ±1%
CR13 MA56
CR14 MA56
R59 1K
R60 200 ±1%
C45 0.022
C46 1μF
R61 137 ±1%
R62 22.1 ±1%
R63 68.1 ±1%
65 560
CR15 MA56
CR16 MA56
R64 1K
C49 0.047
C47 1μF
J1 BNC-080
RF OUT
L7
-15V P1 ③
C55 0.047
C54 0.047
C53 47μF 16V
R66 2.2K
R67 15K
Q11 2SC828A
Q12 2SA564A
R68 220
R69 15K
R70 6.8K
Q13 2SA564A
R71 2.2K
R72 2.2K
R76 2.2K
R77 15K
Q14 2SC828A
Q15 2SA564A
R78 220
R79 15K
Q16 2SA564A
R80 6.8K
R81 2.2K
R82 2.2K
R86 2.2K
R87 15K
Q17 2SC828A
Q18 2SA564A
R88 220
R89 15K
Q19 2SA564A
R90 6.8K
R91 2.2K
R92 2.2K
P1 ⑦ GND
+5V P1 ⑥
L8
C56 0.047
C58 0.047
C57 47μF 10V
C31 0.047
C29 0.022
CR6 MA150
C26 100
U2 μPC157C
CR7 1SS16
R44 33
C30 0.01μF
R39 100K
R40 1K
CR8 MA150
R41 820
R45 150
R37 100K
C27 2200
R38 39K
C28 0.022
R42 15K
R43 5.6K
C32 0.1
R46 68
C33 0.047
R36 15K
CR5 1SV34
R35 1.2K
C21 82
Y1 7.5MHz
L4 7.5MHz OSC coil
R31 33K
Q7 2SC1215
C22 82
R33 33
23 1000
R32 10K
R34 10K
C24 47μF 16V
C25 0.022
P1 ⑩ (40dB)
P1 ⑨ (20dB)
P1 ⑧ (10dB)
J2 UM-QR-1 RF SAMPLE OUT
P1 MCN.105.13
(B.L.K)
(SWEEP DRIVE)
(-15V)
(LEVEL)
(N.C)
(+5V)
(GND)
(10 dB ATT)
(20 dB ATT)
(40 dB ATT)
B.L.K P1 ①
LEVEL P1 ④
R27 2.2K
CR8 MA150
R125 1K
R126 15K
CR7 MA150
CR6 MA150
R111 12K
R112 10K
R113 12K
R122 43K
C15 1000
R123 10K
C1 1000
U4 μPC157C
C14 68
R128 24K
R129 120K
R130 12K
R131 0
R132 2K
R133 750
WIDTH
R134-a 10K
SAWTOOTH
R135 0
R134-b 10K
CENTER
R139 0
A1 ASSY
R30 10K
LEVEL
R105 1K
R107 10K
R106 100
R109 5K
A5 ASSY MONITOR P.B E1
VP-8912A LW-MW VTO A3 A2 A1 4


P1 ② SWEEP DRIVE
L1 SWP coil
R1 47
CR1 MA322
CR2 MA322
C1 68
R2 470K
R3 470K
C2 4
C3 4
R5 10
R6 10
Q1 2SC1215
Q2 2SC1215
R7 33K
R8 33K
R9 12K
R10 3.3K
R11 6.8K
C4 22μF 16V
C5 0.022
C6 0.022
C7 0.022
U1 SN76614N
Q3 2SC1215
Q4 2SC1215
C9 47
R12 430
C8 0.022
C10 33
R14 120
R13 220
C19 0.01
L2 0.82μH
L3 1.0μH
R21 240
Q6 2SC1215
R22 100
C11 33
C12 6
C13 47
C14 3
C15 33
C34 0.01
C36 22μF 16V
R24 470K
Q3 2SA564A
R25 10K
R23 1.24K ±1%
R15 1.62K ±1%
R16 1.62K ±1%
I7 22K
R17 2.2K
Q5 2SC828A
C20 0.022
C16 47μF 10V
J 0.022μF
L5
C1 0.022μF
C41 470Ω
C4 1μF
R51 1.21K ±1%
CR11 MA56
R52 10.2 ±1%
CR12 MA56
R53 11.8 ±1%
R54 100K ±1%
R55 200 ±1%
C43 0.01
C44 1μF
R56 340 ±1%
CR13 MA56
R57 22.1 ±1%
CR14 MA56
R58 37.4 ±1%
R59 100K ±1%
R60 200 ±1%
C45 0.022
C46 1μF
R61 137 ±1%
CR15 MA56
R62 22.1 ±1%
CR16 MA56
R63 68.1 ±1%
R64 100K ±1%
R65 562 ±1%
C47 1μF
C49 0.022
RF OUT
J1 BNC-090
C51 0.022
L6
L7
-15V P1 ③
P1 ⑦ GND
P1 ⑥ +5V
R66 2.2K
R67 15K
Q11 2SC828A
Q12 2SA564A
R68 220
R69 15K
Q13 2SA564A
R70 6.8K
R71 2.2K
R72 2.2K
C52 0.022
R73 2.2K
R74 15K
Q14 2SC828A
Q15 2SA564A
R75 220
R76 15K
Q16 2SA564A
R77 6.8K
R78 2.2K
R79 2.2K
R80 2.2K
R81 15K
Q17 2SC828A
Q18 2SA564A
R82 220
R83 15K
Q19 2SA564A
R84 2.2K
R85 6.8K
R86 2.2K
C53 47μF 16V
C54 0.022
C55 0.022
C56 0.022
C57 47μF 10V
C58 0.022
(40dB) P1 ⑭
(20dB) P1 ⑮
(10dB) P1 ⑧
L4 75 MHz OSC coil
C21 27
CR5 1S1V34
R31 33K
Y1 75MHz
Q7 2SC1215
C22 15
R33 10
R32 10K
R34 1.5K
C23 150
C24 47μF 16V
C25 0.01
R36 10K
R35 1.2K
C29 0.022
U2 μPC157C
I26 100
CR6 MA150
CR7 1S1S5
R44 681
R39 100K
R40 680
C30 1000
CR8 MA150
R41 820
R42 15K
R3 100K
C27 1000
R38 33K
C28 0.022
R43 5.6K
C31 0.01
R45 120
C32 0.1
R46 56
C33 0.022
J2 UM-QR-1 RF SAMPLE-OUT
P1 M3E.105.13
(BLK)
(SWEEP DRIVE)
(-15V)
(LEVEL)
(N.C)
(+5V)
(GND)
(10 dB ATT)
(20 dB ATT)
(40 dB ATT)
BLK P1 ①
LEVEL P1 ④
CR9 MA150
R127 2.2K
R111 12K
R123 1K
R112 10K
R125 15K
R113 27K
CR7 MA150
CR6 MA150
R114 20K
R115 0
R116 15K
R120 100K
CR4 MA150
R122 39K
C15 1000
U4 μPC157C
C13 1000
C14 68
R123 10K
R132 2K
R133 750
WIDTH
R134-a 10K
SAWTOOTH
R128 30K
+5V
R135 0
R134-b 10K
CENTER
R130 8.2K
R131 0
R139 0
AI ASSY
R106 1K
R107 10K
R108 100
R109 5K
R3 10K
LEVEL
AS ASSY MONITOR P.B EJ



VP-8914A FM VTO (A3) (A2) (A1) 5

M31.10S.01

	C9	C10	C11	C12	C13	C15	C33	CR20	R1	R2	R3	R4	R5	R33	R34	R39
VP-8811A	0.47	0.47	0.47	0.47	0.47	0.047	—	—	22	22	22	22	22	820	22K	0
VP-8812A	4.7μF	4.7μF	4.7μF	4.7μF	4.7μF	—	—	—	100	100	100	100	100	0	—	0
VP-8813A	2.2μF	2.2μF	2.2μF	2.2μF	2.2μF	—	2200	MA150	100	100	100	100	100	0	—	0
VP-8814A	1μF	1μF	1μF	1μF	1μF	—	2200	MA150	47	47	47	47	47	0	—	0

VP-8911A to VP-8914A MARKER (1)

P1 6 5 4 3 2 9

P1 10

P2 11

P2 6

P3 UM-QP-1.5

R1 56

C1 1000

R2 8.2K

R3 6.8K

R4 1.5K

R5 22

R6 1.5K

R7 330

R8 1.5K

C2 100

C3 0.01

C4 0.01

Q1 2SC1215

Q2 2SC1215

+5V

-15V

SN7400N U11

SN7493AN U1

SN7476N U2

SN7476N U4 U4

SN7400N U13 U11 U11 U11

SN7410N U5

SN7476N U8

SN74192N U12

SN7493N U6

P2 10

P2 9

SN7410N U3 U5 U5 U3

SN7410N U3 U2

P2-13.14.15
M31-15P.01

+5V

C11 C12 C13 C14 C15 C16 C17 100μF x2 10V

0.047 x5

C18 0.047

C19 100μF 16V

-15V

P1-1
M31.10P.01

SN7400N U13

R9 1K

R10 1K

C5 22

C6 33

C7 220

C8 220

Y1 16MHz

SN7493AN U14 U7 U15 U16

SN7490AN

U8

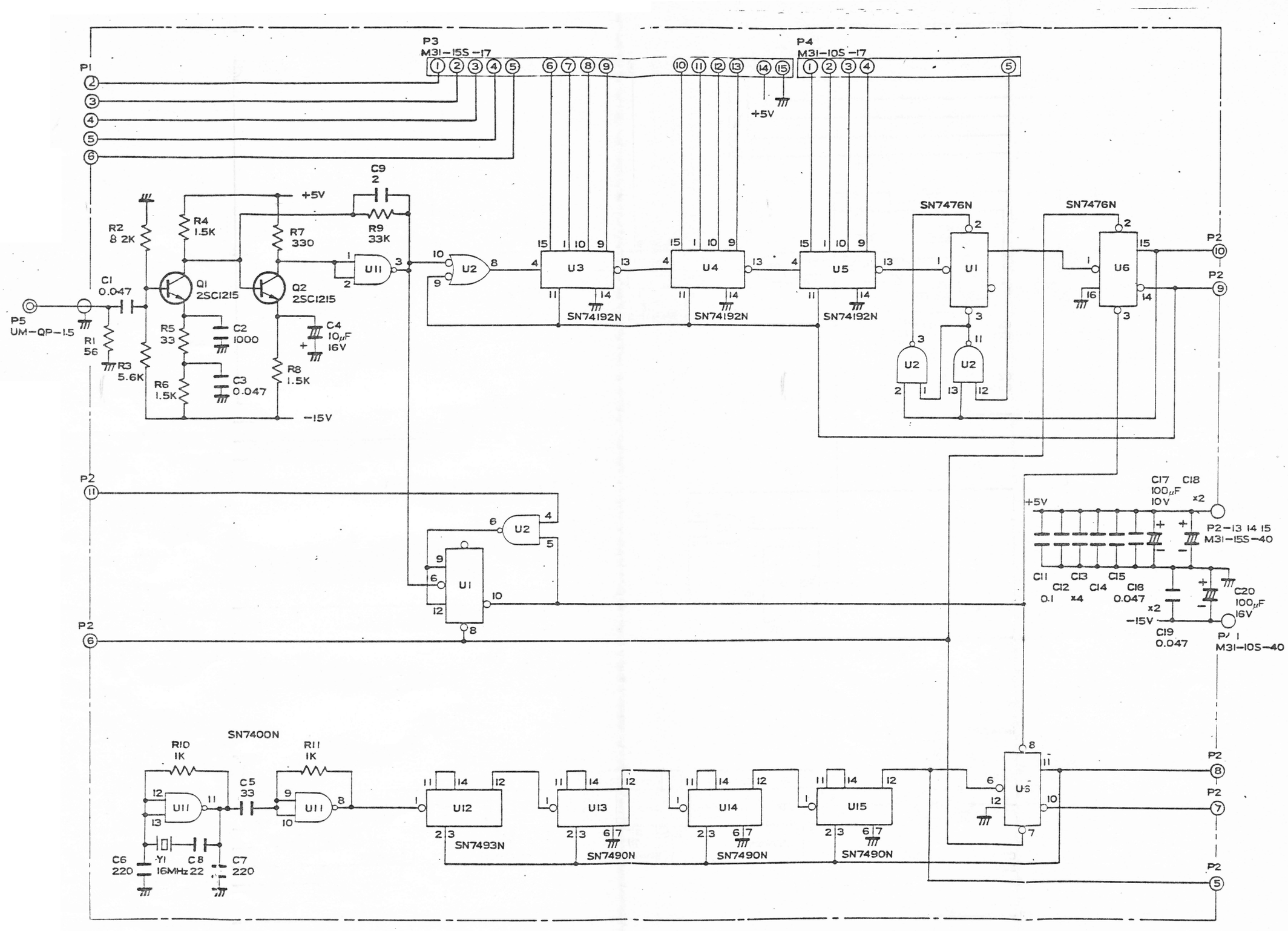
P2 8

P2 7

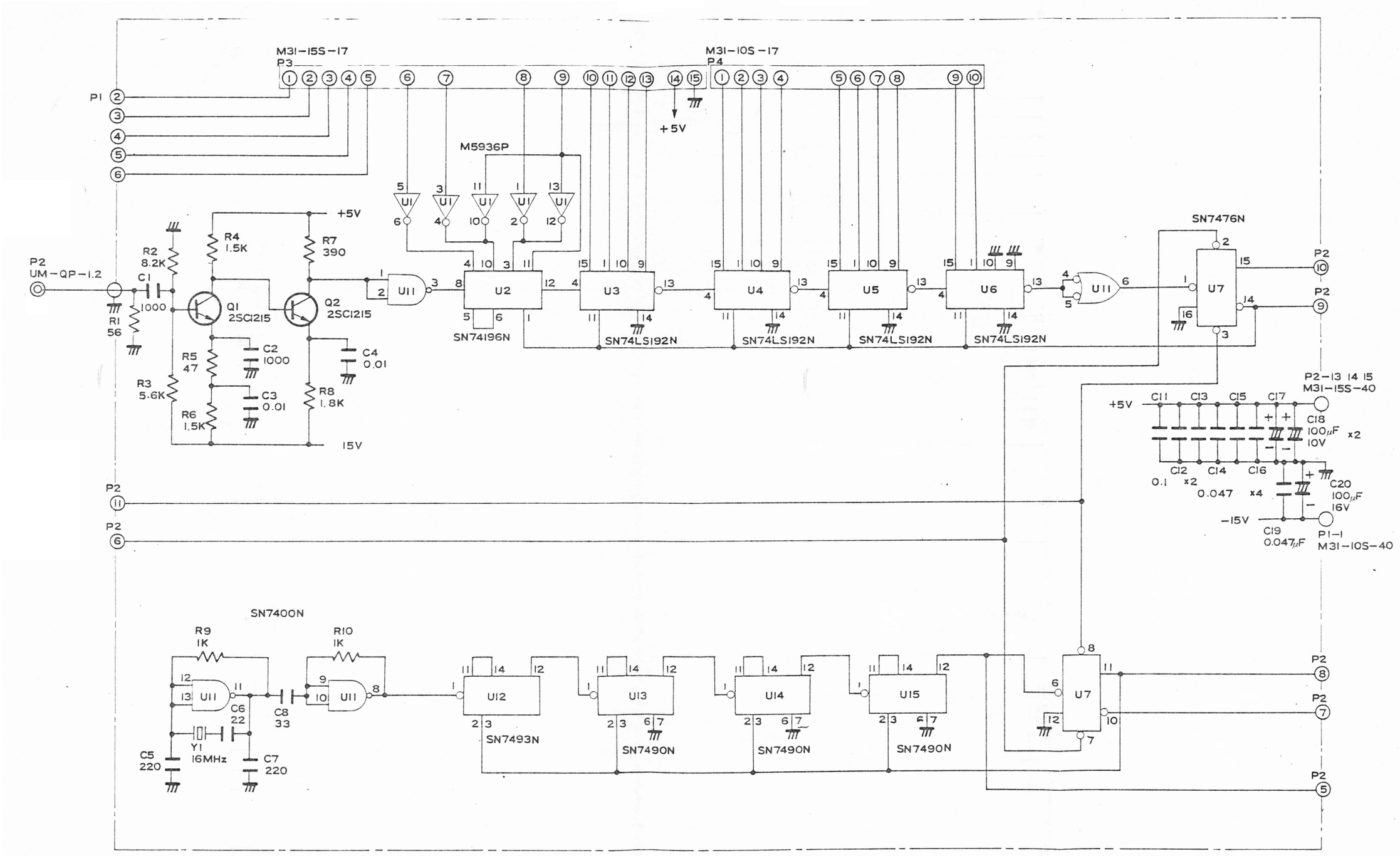
P2 5

P.B··· E1

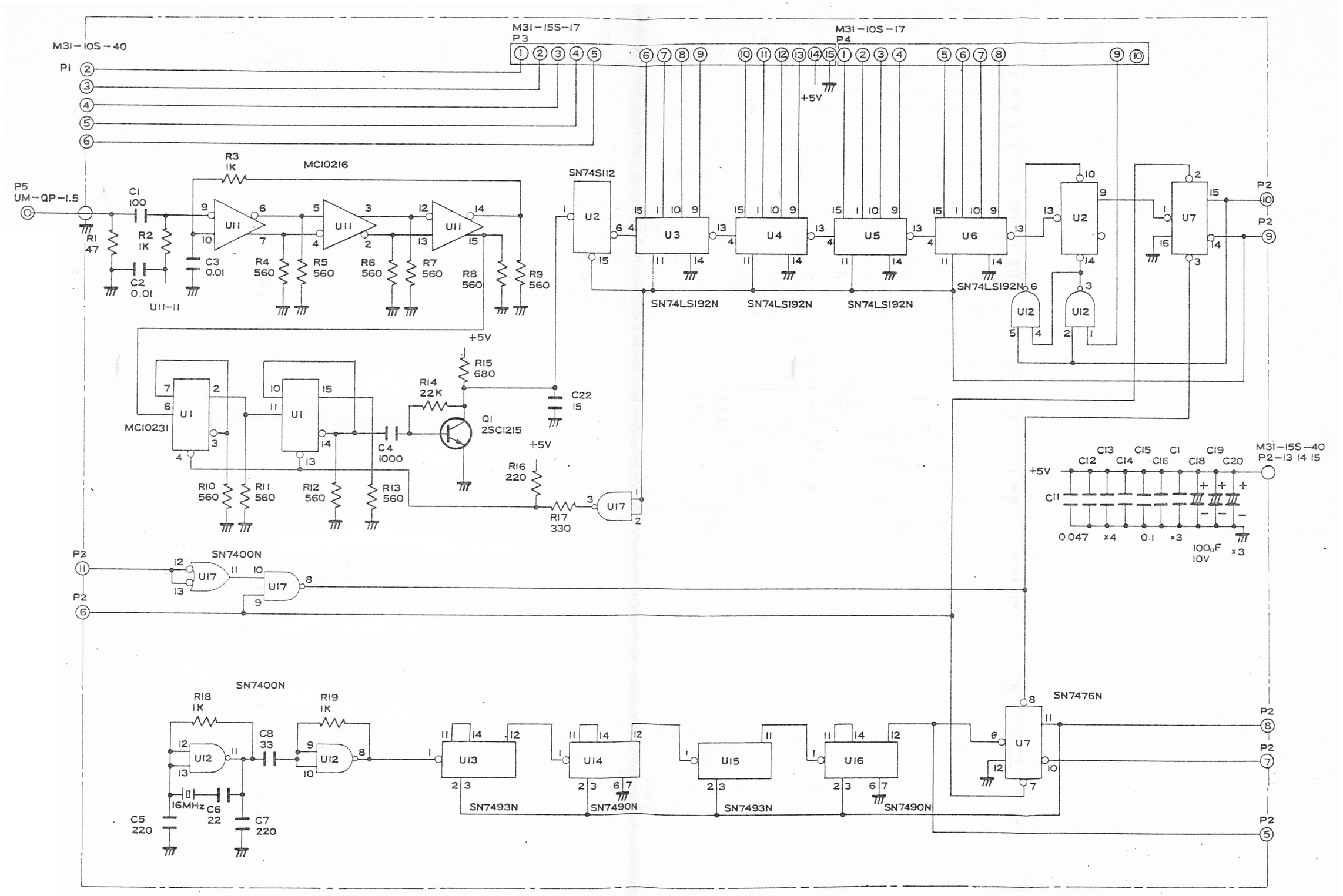
VP-8911A IF MARKER (2)



VP-8912A L W MARKER (2)



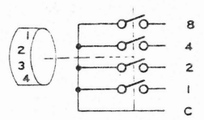
VP-8913A SW MARKER (2)



VP-8914A FM MARKER (2)

Digital Switch

S11 S12 S13 S14 S15 S21 S22 S23 S24 S25 S31 S32 S33 S34 S35 S41 S42 S43 S44 S45 S51 S52 S53 S54 S55



note 1 From Digital Switch S15 − 1 → BCD Cord 1 → Digital Switch S15

note 2 From Digital Switch S51~55 − C → Digital Switch Comon → Digital Switch S51. 52. 53. 54. 55.

note 3 U1 to U9 are M5930

In case of LW − MW VP−8812A

In case of FM VP−8814A

In case of SW VP−8813A

note 1 S15 − 1 S25 − 1 S35 − 1 S45 − 1 S55 − 1 S15 − 2 S25 − 2 S35 − 2 S45 − 2 S55 − 2 S15 − 4 S25 − 4 S35 − 4 S45 − 4 S55 − 4 S15 − 8 S25 − 8 S35 − 8 S45 − 8 S55 − 8 S14 − 1 S24 − 1 S34 − 1 S44 − 1 S54 − 1 S14 − 2 S24 − 2 S34 − 2 S44 − 2 S54 − 2 S14 − 4 S24 − 4 S34 − 4 S44 − 4 S54 − 4 S14 − 8 S24 − 8 S34 − 8 S44 − 8 S54 − 8 S13 − 1 S23 − 1 S33 − 1 S43 − 1 S53 − 1 S13 − 2 S23 − 2 S33 − 2 S43 − 2 S53 − 2 S13 − 4 S23 − 4 S33 − 4 S43 − 4 S53 − 4 S13 − 8 S23 − 8 S33 − 8 S43 − 8 S53 − 8 S12 − 1 S22 − 1 S32 − 1 S42 − 1 S52 − 1 S12 − 2 S22 − 2 S32 − 2 S42 − 2 S52 − 2 S12 − 4 S22 − 4 S32 − 4 S42 − 4 S52 − 4 S12 − 8 S22 − 8 S32 − 8 S42 − 8 S52 − 8 S11 − 1 S21 − 1 S31 − 1 S41 − 1 S51 − 1 S11 − 2 S21 − 2 S31 − 2 S41 − 2 S51

51 52 54 58 41 42 44 48 31 32 34 38 21 22 24 28 11 12

U1 U1 U2 U2 U3 U3 U4 U4 U5 U5 U6 U6 U7 U7 U8 U8 U9 U9

CR1 MAI50 CR2 MAI50 CR3 MAI50 CR4 MAI50 CR5 MAI50 CR6 MAI50 CR7 MAI50 CR8 MAI50 CR9 MAI50 CR10 MAI50 CR11 MAI50 CR12 MAI50 CR13 MAI50 CR14 MAI50 CR15 MAI50 CR16 MAI50 CR17 MAI50 CR18 MAI50

note 2
S51 55 − C
S41 45 − C
S31 35 − C
S21 25 − C
S11 15 − C

+ 5V

C1 0.047

C2 100μF 10V

J1 M31−15P−01

J2 M31−10P−01

TO Marker P.B

TO Marker P.B

VP−8911A to VP−8914A MATRIX